

NON-PUBLIC?: N  
ACCESSION #: 8903280207  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: DIABLO CANYON UNIT 1 PAGE: 1 OF 7

DOCKET NUMBER: 05000275

TITLE: REACTOR TRIP DUE TO TURBINE TRIP FROM ANTI-MOTING  
RELAY CAUSED  
BY A CLOSED ROOT VALVE ON THE LOW PRESSURE SIDE SENSING LINE  
EVENT DATE: 09/01/88 LER #: 88-026-01 REPORT DATE: 03/21/89

OPERATING MODE: 1 POWER LEVEL: 013

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: DAVID C. MARBURGER, REGULATORY COMPLIANCE ENGINEER

TELEPHONE: (805) 595-7351

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO EXPECTED SUBMISSION DATE:

ABSTRACT:

On September 1, 1988 at 2016 PDT, at approximately 13 percent power during restart, Unit 1 experienced a unit trip/turbine trip initiated by the anti-motoring relay, and subsequent reactor trip. The unit was stabilized in Mode 3 (Hot Standby) and the 4-hour nonemergency report required by 10 CFR 50.72(b)(2)(ii) was made at 2110 PDT.

The event was caused by the root isolation valve on the low side of differential pressure switch PS-30 being in the closed position. Safety systems responded as designed.

An investigation led to the conclusion that the valve was closed between July 13, 1988 (the previous Unit 1 startup in which no abnormal behavior was noted) and August 9, 1988 (when the valve was noted to be in a closed position). Records search and personnel inquiries did not provide any information on the

reason or the precise time when the valve was closed.

To reduce the probability of recurrence, administrative procedures were issued on September 8, 1988 to provide better instruction on the authorization needed to operate plant components and to provide better documentation of component status.

Procedures, OP C-5; I, "Moisture Separator/Reheater-Make Available" and OP C-2, I, "Main Steam and Steam Dump System Alignment Check List" have been revised to include the PS-30 root valves.

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END OF ABSTRACT

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#### I. Initial Conditions

Unit 1 was in Mode 1 (Power Operation) at approximately 13 percent power.

#### II. Description of Event

##### A. Event:

On September 1, 1988, at 2016 PDT, during the restart of Unit 1, with the unit in Mode 1 at approximately 13 percent power, Unit 1 experienced a turbine trip (TA)(TRB) and subsequent reactor trip (JC)(BKR) 30 seconds after paralleling the main generator (GEN). The turbine trip followed a unit trip from the anti-motoring relay (TRB)(02) actuation when initiated by differential pressure switch PS-30 (JJ)(PS). PS-30 measures the differential pressure between the high-pressure turbine first stage pressure and the high-pressure turbine exhaust. The PS-30 contacts initiate a thirty second delay timer in the antimotoring relay to trip the unit and subsequently, the turbine so that the low-pressure turbine blading does not experience excessive heat buildup. A reactor trip was automatically initiated following the turbine trip because reactor power was greater than ten percent. The unit was stabilized in Mode 3 (hot standby) in accordance with approved plant procedures. The four-hour nonemergency report required by 10 CFR 50.72 was made at 2110 PDT.

##### B. Inoperable structures, components, or systems that contributed to the event.

None.

C. Dates and approximate times for major occurrences.

1. On approximately April 10, 1988: Low pressure side root valve installed on differential pressure switch PS-30
2. On July 13, 1988: Unit 1 paralleled during startup following refueling without abnormal performance of PS-30.
3. On August 9, 1988: PS-30 low pressure side root valve noted in closed position.
4. On September 1, 1988, at 2016 PDT: Event Date-Unit/Turbine trip due to anti-motoring relay in conjunction with PS-30, followed by a reactor trip.

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5. On September 1, 1988, at 2110 PDT: The 4-hour nonemergency notification was made to NRC as required by 10 CFR 50.72.
6. On September 1, 1988, at 2200 PDT: Unit stabilized in Mode 3.

D. Other systems or secondary functions affected:

None

E. Method of discovery:

The event was immediately apparent due to alarms and other indications in the control room.

F. Operator actions:

Operators stabilized the unit in Mode 3 in accordance with plant emergency procedures.

#### G. Safety system responses:

1. The unit/turbine tripped.
2. The reactor trip breakers (JC)(BKR) opened.
3. The control rod drive mechanisms (AA)(DRIV) allowed the control rods to drop into the reactor.

#### III. Cause of Event

##### A. Immediate Cause:

Reactor trip due to unit/turbine trip from actuation of the anti-motoring relay.

##### B. Root Cause:

The anti-motoring relay actuated due to a closed root valve on the low pressure side of differential switch PS-30 which prevented proper operation of the switch. An investigation into the reason for the low pressure side root valve being closed determined the following:

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1. The root valve had been initially installed with a design change on approximately April 10, 1988, during the Unit 1 second refueling outage.
2. Proper alignment of the PS-30 root valves was verified by the Design Change Sponsor during a modification walkdown on April 30, 1988. This walkdown was performed to verify that the design change was properly implemented prior to closure of the design change package.
3. The Unit was successfully paralleled to the system on July 13, 1988, and again on July 14, 1988 as part of the normal start-up following the refueling outage. No problems, abnormal alarms or indications were observed from the circuit at these times.
4. On August 9, 1988, during a Post-Modification In-Service Leak Inspection, a construction inspector noted that the PS-30 low side root valve was closed.

Based on the above sequence and the fact that no abnormal alarms or indications were noted during previous evolutions, it was concluded that the PS-30 root valve had been closed at some time during Unit 1 operation between July 13, 1988, and August 9, 1988. A search of clearance and maintenance records does not indicate any reason for this valve to have been closed. All plant departments were requested to provide any information on when or why the PS-30 root valve may have been closed. No information was identified by this search. The root cause for the valve being closed is unknown.

#### C. Contributing Cause:

Although this event was caused by the PS-30 low side root valve being closed, the following events or conditions contributed to the failure to discover and correct the problem prior to starting up the unit.

1. Operating procedures were not changed to include the root valve which was installed during the Unit 1 second refueling outage, (approximately April 10, 1988), because operations review of the Design Change Package did not identify that a new valve was being installed. The fact that the valve installation was not noted involved contributing factors in that; although shown on the isometric drawing, it was not highlighted; the Design Engineering practice is not to show instrument root valves on the Piping and Instrument Drawing (P&ID); and it is not their practice to list root valve installation in the design change description.

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2. The Operating Valve Identification Drawing (OVID), used by the Operations Department for valve position requirements, was not updated in a timely manner to provide documentation of the installation of the PS-30 low side root valve. The OVID Supervisor failed to issue an OVID change transmittal at the time of the change and elected, in error, to incorporate the valve installation in the next drawing revision.

3. The Design Change Sponsor marked the DCP closure form to indicate that plant procedure and OVID changes did not need to be completed prior to placing the modified system in service. The Sponsor made this decision because he did not consider that

he had the authority to make a commitment for actions of other organizations. The procedure that provides guidance for implementing design changes (AP C-1S1, "Onsite Plant Modification Administration") requires that drawing and procedure changes be completed prior to releasing modified systems for unrestricted operation.

4. On August 9, 1988, during a Post-Modification In-Service Leak Inspection, the PS-30 low side root valve was noted to be closed and was reported to the Unit 1 Shift Foreman. The Shift Foreman could find no drawing or procedure which documented this valve or its required position. The Shift Foreman did not have the valve opened, since he had no information of the effect of opening the valve at power. The Shift Foreman failed to follow up to determine the proper position of the valve and the effects of opening the valve at power. Management was not informed, and an Action Request was not initiated on the problem.

5. During the start-up on September 1, 1988, the alarm associated with PS-30 actuated when the generator output breaker was closed, but did not reset. The reset indicates that the turbine generator has loaded properly. Since the alarm routinely actuates during a paralleling operation, it was considered normal, and the fact that it did not reset was not noticed by the control room operators.

#### IV. Analysis of Event

A reactor trip is a previously analyzed Condition II event. Since the safety systems functioned as designed, there were no safety consequences or implications from this event. Thus the health and safety of the public was not affected by this event.

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#### V. Corrective Actions

##### A. Immediate Corrective Actions:

1. The low side root valve for S-30 was opened.
2. A change was made to the operating procedure governing turbine generator start-ups (OP C-3:II) which directs operators to

verify that the anti-motoring trip alarm clears within 10 seconds of paralleling the generator to the system.

3. The OVID drawing which shows the installation of the PS-30 low side root valve was completed and issued to key plant drawing books.

#### B. Corrective Actions to Prevent Recurrence:

1. This event was reviewed with all applicable Operations Personnel in the form of an Operations Incident Summary. The summary stresses the importance of follow up on unresolved plant problems.

2. Operations Personnel who work with OVID drawings have been instructed to provide at least an OVID Change Transmittal to Key Plant Drawing books in order to identify changes prior to placing recently modified systems in service.

3. A memorandum has been issued to all Design Change Sponsors which reinforces the importance of following all requirements of the design control procedure, AP C-1S1.

4. The implementation process for Design Change Packages is being given a detailed review.

5. Procedures OP C-5:I, "Moisture Separator/Reheater-Make Available" and OP C-2:I, "Main Steam and Steam Dump System Alignment Check List" have been revised to include the root valves for PS-30.

6. On September 8, 1988, Administrative Procedure AP C-53, "Authorization for Equipment Operation and Maintenance", was issued to provide instruction on authorization needed to operate plant components and Administrative Procedure AP C-153, "Plant Status Controls", was issued to provide improved documentation of changes in component status. Although the cause for the instrument root valve being closed has not been determined, the instructions provided in these new procedures should reduce the probability of recurrence of an event of this type.

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VI. Additional Information

A. Failed Components:

None.

B. Previous LERs:

LER 2-87-004-01 Turbine trip on PS-30

Unit 2 unit/turbine trip and subsequent reactor trip on April 3, 1987 from PS-30 actuation from 13% power. Root cause stated to be "The system does not provide accurate enough indication, at low power levels, for the operator to determine if turbine generator load is sufficient to prevent anti-motoring relay actuation and a subsequent unit trip." Corrective actions taken for the previous event, relative to PS-30, included the addition of an alarm when the relay is actuated, the evaluation of the instrument tubing installation and a reduction in the pressure switch setting.

The instrument tubing and pressure switch setting changes are not applicable in this event as the closed root valve functionally isolated them. The alarm did function, however as discussed under III above, the fact that the alarm did not clear went unnoted.

LER 2-88-024-00

This LER addresses an event of a mispositioned valve in the Auxiliary Feedwater system. Although this is not a PS-30 event, valve misposition is a common cause between the events. Valve misposition and corrective actions as a generic subject are being addressed in this LER.

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Pacific Gas and Electric Company

77 Beale Street James D. Shiffer  
San Francisco, CA 94106 Vice President  
4151972-7000 Nuclear Power Generation  
TWX 910-372-6587

March 21, 1989

PG&E Letter No. DCL-89-069



U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80  
Diablo Canyon Unit 1  
Licensee Event Report 1-88-026-01  
Reactor Trip due to Turbine Trip from Anti-motoring Relay  
Caused by a Closed Root Valve on the Low Pressure Side Sensing Line

Gentlemen:

PG&E is submitting the enclosed revision to Licensee Event Report 1-88-026 concerning a reactor trip due to a turbine trip. The turbine trip resulted from the actuation of an anti-motoring relay caused by a closed root isolation valve on the low pressure side of differential switch PS-30. This revision is being submitted to report the results of the root cause investigation and the corrective actions taken to prevent recurrence of the event.

This event has in no way affected the public's health and safety.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

J. D. Shiffer

cc: J. B. Martin  
M. M. Mendonca  
P. P. Narbut  
B. Norton  
H. Rood  
B. H. Vogler  
CPUC  
Diablo Distribution  
INPO

Enclosure

DC1-88-OP-NO94

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